

**CHAPTER 89-04-10**  
**DAMS CONSTRUCTED OF OR IMPOUNDING WASTE MATERIAL**

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**89-04-10-01. General.** No waste material shall be used in or impounded by existing or new dams without the approval of the state engineer. The permittee shall design, locate, construct, operate, maintain, modify, and abandon or remove all dams (used either temporarily or permanently) constructed of waste materials, in accordance with the requirements of this chapter.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14

**89-04-10-02. Construction of dams.**

1. Waste shall not be used in the construction of dams unless demonstrated through appropriate engineering analysis to have no adverse effect on stability.
2. Plans for dams subject to this section shall be approved by the state engineer before construction.
3. Construction requirements are as follows:
  - a. Design shall be based on the flood from the probable maximum precipitation event unless the permittee shows that the failure of the impounding structure would not cause loss of life or severely damage property or the environment, in which case, depending on site conditions, a design based on a precipitation event of no less than hundred-year frequency may be approved by the state engineer.
  - b. The design freeboard distance between the lowest point on the embankment crest and the maximum water elevation shall be at least five feet [1.52 meters] to avoid overtopping by wind and wave action.
  - c. Dams shall have minimum safety factors as follows:

Case	Loading Condition	Minimum Safety Factor
I	End of construction	1.3
II	Partial pool with steady seepage saturation	1.5
III	Steady seepage from spillway or decant crest	1.5
IV	Earthquake (cases II and III with seismic loading)	1.0

- d. The dam, foundation, and abutments shall be stable under all conditions of construction and operation of the impoundment. Sufficient foundation investigations and laboratory testing shall be performed to determine the factors of safety of the dam for all loading conditions in subdivision c and for all increments of construction.
- e. Seepage through the dam, foundation, and abutments shall be controlled to prevent excessive uplift pressures, internal erosion, sloughing, removal of material by solution, or erosion of material by loss into cracks, joints, and cavities. This may require the use of impervious blankets, pervious drainage zones or blankets, toe drains, relief wells, or dental concreting of jointed rock surface in contact with embankment materials.
- f. Allowances shall be made for settlement of the dams and the foundation so that the freeboard will be maintained.
9. Impoundments created by dams of waste materials shall be subject to a minimum drawdown criteria that allows the facility to be evacuated by spillways or decants of ninety percent of the volume of water stored during the design precipitation event within ten days.
- h. During construction of dams subject to this section, the structures shall be periodically inspected by a registered professional engineer to ensure construction according to the approved design. On completion of construction, the structure shall be certified by a registered professional engineer experienced in the field of dam construction as having been constructed in accordance with accepted professional practice and the approved design.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14

**89-04-10-03. Inspection.** All dams shall be routinely inspected by a registered professional engineer, or someone under the supervision of a registered professional engineer.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14

**89-04-10-04. Maintenance.** All dams shall be routinely maintained. Vegetative growth shall be cut where necessary to facilitate inspection and repairs. Ditches and spillways shall be cleaned. Any combustible materials present on the surface, other than that used for surface stability such as mulch or dry vegetation, shall be removed. Any other appropriate maintenance procedures necessary, as determined by the state engineer, shall be followed.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14

**89-04-10-05. Certification.** All dams subject to this chapter shall be certified annually as having been constructed and modified in accordance with current prudent engineering practices to minimize the possibility of failures. Any changes in the geometry of the impounding structure shall be highlighted and included in the annual certification report. These certifications shall include a report on existing and required monitoring procedures and instrumentation, the average and maximum depths and elevations of any impounded structures, any fires occurring in the material over the past year, and any other aspects of the structures affecting their stability.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14

**89-04-10-06. Modification.** Any enlargements, reductions in size, reconstruction, or other modification of the dams shall be approved by the state engineer before construction begins.

**General Authority:** NDCC 28-32-02, 61-02-11, 61-03-13

**Law Implemented:** NDCC 61-02-14